

CLAIMS

1. A battery pack comprising: a plurality of parallel arranged battery modules (2), each battery module (2) consisting of a plurality of cells (5) formed by encasing elements for electromotive force in prismatic cases, the cells (5) being electrically connected in series and coupled together in one piece with gaps (8) formed therebetween; and a restraining tool having connecting members (4) extending through the gaps at both ends of the parallel arranged battery modules and between two given cells.

2. The battery pack according to claim 1, wherein a connection terminal (6, 7) for electrically connecting the cells (5) with each other is protruded on one of opposing side faces of the cells such as to form gaps (8) between the opposing side faces of the cells that make up the battery module (2).

3. The battery pack according to claim 1, wherein the restraining tool comprises end plates (3) arranged at both ends in an alignment direction of the battery modules (2), and both ends of the connecting members (4) are coupled to the end plates.

4. The battery pack according to claim 1, wherein components for forming cooling medium passages (16) between side faces of the cells (5) are provided between the parallel arranged battery modules (2).

5. The battery pack according to claim 4, wherein the components forming the cooling medium passages (16) are formed of separate spacer

portions (12) independently of the battery modules (2).

6. The battery pack according to claim 4, wherein the cell (5) cases are made of a metal and the components forming the cooling medium passages (16) are insulating spacer portions (12) provided
5 independently of the battery modules (2).

7. The battery pack according to claim 5 or 6, wherein the spacer portions (12) have holder portions (13) that fit in the gaps (8) between the cells (5, 5) for positioning the cells.

8. The battery pack according to claim 5, wherein the spacer
10 portions (12) have projections (15) that abut on the long side faces of the cells (5) to form the cooling medium passages (16).

9. The battery pack according to claim 8, wherein heat dissipation fins (17, 30) facing the cooling medium passages (16) are provided on the long side faces of the cells (5).

15 10. A battery pack comprising: a plurality of parallel arranged battery modules (2), each battery module (2) consisting of a plurality of cells (5) formed by encasing elements for electromotive force in prismatic cases, the cells (5) being electrically connected with each other in series by connection terminals (6, 7) protruded on side faces
20 thereof; holders (11) for the battery modules disposed between parallel arranged adjacent battery modules; end plates (3) arranged at both ends in an alignment direction of the battery modules; and connecting members (4) extending through gaps (8) at both ends of the battery modules and between two given cells and coupling both
25 end plates together, wherein each holder includes a spacer portion

(12) forming a cooling medium passage (16) between side faces of the cells and holder portions (13) provided on both sides of the spacer portion at locations corresponding to both sides of each cell for engaging with and retaining the cells.

5 11. The battery pack according to claim 10, wherein the connection terminals (6, 7) of the cells (5) are protruded on short side faces of the cell cases, and the cooling medium passages (16) are formed between the long side faces of the cells.

10 12. The battery pack according to claim 10, wherein the holder portions (13) of the holders (11) engage with generally half or less of the width of the short side faces of the cells (5).

13. The battery pack according to claim 10, wherein the cell (5) cases are made of a metal and the holders (11) are made of an insulating material.

15 14. The battery pack according to claim 10, wherein the holder (11) includes support portions (20) at both ends, which are placed on support members, and one of the support portions is provided with a fixing bolt hole or screw hole (22).

20 15. The battery pack according to claim 14, wherein the support portions (20) at both ends of the holders (11) are formed with an engaging protrusion (23) on one side and an engaging recess (24) on the other side in which the engaging protrusion fits.

25 16. The battery pack according to claim 10, wherein the holder portions (13) of the holders (11) include support projections (31) on the top and the bottom, which are engaged with an upper case (34)

and a lower case (33) covering the battery pack.

17. The battery pack according to claim 10, wherein the spacer portions (12) have projections (15) that abut on the long side faces of the cells (5) to form the cooling medium passages (16).

5 18. The battery pack according to claim 17, wherein heat dissipation fins (17, 30) facing the cooling medium passages (16) are provided on the long side faces of the cells (5).

19. The battery pack according to claim 1 or 10, wherein the connecting members (4) are arranged on both sides of each of the cells
10 (5) of the battery modules (2).

20. The battery pack according to claim 4 or 10, wherein heat dissipation fins (17, 30) forming the cooling medium passages (16) are provided on the long side faces of the cells (5).

21. The battery pack according to claim 9 or 18, wherein the
15 heat dissipation fins (17, 30) are resiliently pressed against the long side faces of the cells (5) by pressure applied from the spacer portions (12) forming the cooling medium passages (16).